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AREI

UPDATES

Updates on Agricultural Resources and Environmental Indicators

Number 6

July 1996

# Increases in Agricultural Productivity, 1948-1993

- **Agricultural productivity, output per unit of input, increased at an average annual rate of 1.8 percent over the 1948-1993 period.**
- **Productivity growth was the principal factor responsible for economic growth in the agricultural sector. Aggregate agricultural input use changed very little during the period.**
- **The relatively stable aggregate input level disguises larger shifts in individual inputs: chemical and other purchased inputs and capital increased while labor input declined.**

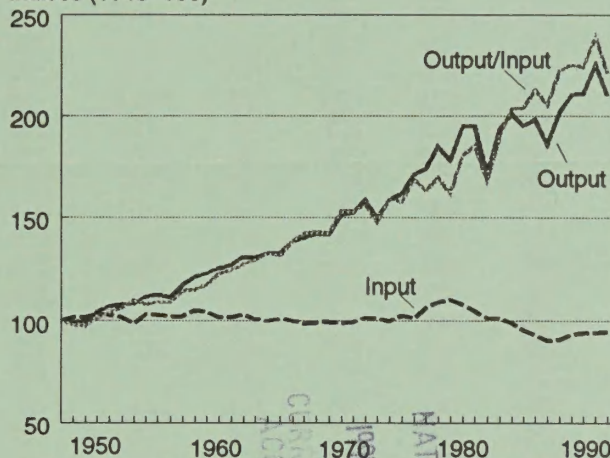
During the 1948-93 period, agriculture's productivity growth rate of 1.8 percent per year exceeded the 1.1 percent average annual rate in the private nonfarm sector.

Agricultural producers increased productivity and held down production costs by substituting capital (primarily durable equipment) and purchased inputs (mainly pesticides, fertilizer, energy, seeds, feed, and livestock) for labor. This is clear from labor's decreasing share in total input cost. Labor costs (including the imputation of self-employed labor) fell from 41 percent of total farm input costs in 1948 to 24 percent in 1993. In contrast, the share of capital in total input costs increased from 9 percent in 1948 to 28 percent in 1993. Purchased inputs accounted for approximately 50 percent of the total cost of agricultural inputs in both years.

The stable input cost share for purchased inputs disguises significant shifts within this broad category during the 1948-93 period. While purchased inputs in aggregate increased at an average rate of 1.3 percent per year, pesticide

## Productivity growth in U.S. agriculture, 1948-93

Indices (1948=100)



Source: USDA, ERS estimates

consumption grew by 6.1 percent, and feed, seed, and livestock purchases grew by 2.2 percent per year. In contrast, fertilizer use increased only 1.7 percent annually, and energy inputs less than 1 percent.

Among other input categories, labor in agriculture declined at an average annual rate of 2.7 percent over the postwar period, with greater reductions occurring in self-employed labor than in hired labor. Capital input to agriculture increased dramatically in the immediate postwar period, but the average annual rate of growth over the entire 1948-93 period was less than 1 percent (0.7). Farm real estate inputs declined modestly.

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## About AREI UPDATES

**AREI UPDATES** is a periodic series that supplements and updates information in **Agricultural Resources and Environmental Indicators (AREI)**, USDA, ERS, AH-705, Dec. 1994. **UPDATES** report recent data from surveys of farm operators and others knowledgeable about changing agricultural resource use and conditions, with only minimal interpretation or analysis. Please contact the individual listed at the end of the text for additional information about the data in this **UPDATE**. If you would like to be added to the mailing list or have other questions about **AREI UPDATES** or **AREI**, contact Richard Magleby, (202) 219-0436. [rmagleby@econ.ag.gov]



Table 1. Farm production, input use and productivity, 1948-1993 (1948=100)

Year	Livestock and livestock products					Crops							
	Farm output	All <sup>1</sup>	Meat animals	Dairy products	Poultry and eggs	All <sup>2</sup>	Food grains	Feed crops	Oil crops	Sugar crops	Cotton and cotton-seed	Vegetables and melons	Fruit and tree nuts
1948	100	100	100	100	100	100	100	100	100	100	100	100	100
1949	100	106	105	103	114	95	86	91	91	105	110	103	89
1950	99	110	113	97	123	91	80	93	107	132	68	103	86
1951	104	116	121	98	131	95	79	90	98	105	104	94	95
1952	107	118	123	98	134	99	101	93	97	109	103	91	93
1953	108	120	122	103	137	99	93	92	94	123	114	101	95
1954	108	124	128	104	145	96	82	95	106	137	95	99	98
1955	112	127	134	105	143	100	77	100	121	123	104	103	102
1956	113	130	130	106	159	100	81	98	142	125	92	102	104
1957	112	128	126	106	162	99	76	107	141	145	76	104	106
1958	118	129	128	105	172	108	112	114	172	142	80	103	97
1959	121	135	138	104	178	110	90	115	152	159	101	107	106
1960	123	134	135	105	175	114	107	120	163	196	101	100	112
1961	125	140	140	108	189	115	98	111	189	220	100	111	115
1962	127	141	143	108	188	116	91	114	191	226	104	108	117
1963	131	145	150	107	192	120	96	119	201	281	107	109	113
1964	130	149	155	109	199	116	106	109	202	286	106	99	115
1965	133	144	147	107	205	123	109	124	243	262	103	101	121
1966	133	147	152	103	217	122	110	123	261	262	66	112	124
1967	138	152	159	102	227	128	124	135	273	256	54	113	123
1968	140	152	161	101	221	131	131	131	307	300	72	120	121
1969	142	152	162	100	226	135	121	135	313	302	85	115	143
1970	142	158	171	101	236	129	113	126	319	294	72	114	136
1971	151	160	174	102	239	144	133	153	354	301	72	115	142
1972	152	162	175	104	246	144	127	149	356	316	94	117	127
1973	158	164	182	99	239	154	140	154	428	296	88	115	153
1974	149	161	177	100	239	141	149	129	343	271	80	120	157
1975	158	152	161	100	234	160	176	153	430	320	63	120	168
1976	161	160	168	104	253	159	175	154	362	330	79	125	162
1977	170	163	169	106	259	173	165	165	493	297	95	129	172
1978	173	163	168	105	272	178	153	178	524	299	73	137	169
1979	184	166	172	106	277	196	179	189	637	271	99	140	180
1980	178	174	178	111	297	178	199	160	491	284	74	140	196
1981	194	177	178	114	308	205	235	192	559	317	106	143	193
1982	195	175	171	117	309	206	228	197	608	279	78	151	192
1983	170	179	174	120	311	161	194	129	457	285	54	145	192
1984	193	176	170	116	319	201	214	191	527	279	88	154	190
1985	201	181	170	123	333	211	200	211	581	283	89	165	188
1986	194	182	170	123	347	199	176	201	535	300	65	165	182
1987	198	186	172	123	378	202	177	178	533	330	100	179	208
1988	185	190	175	125	387	178	160	131	437	314	105	163	224
1989	201	191	175	124	402	204	175	179	530	315	82	172	214
1990	210	193	174	127	427	218	226	185	529	320	104	188	212
1991	211	198	180	127	446	215	172	181	567	332	119	195	207
1992	225	203	181	130	466	237	211	211	603	347	119	202	220
1993	209	204	181	129	485	208	202	161	515	327	109	189	231
Average annual rates of growth													
1948-93	1.65	1.58	1.31	0.57	3.51	1.64	1.56	1.06	3.64	2.64	0.19	1.42	1.86
1948-53	1.53	3.59	4.05	0.56	6.35	-0.25	-1.43	-1.75	-1.18	4.20	2.64	0.20	-1.00
1953-57	0.83	1.64	0.62	0.85	4.16	0.10	-4.94	3.89	10.05	4.00	-10.14	0.69	2.69
1957-60	3.25	1.65	2.36	-0.38	2.48	4.72	11.32	3.83	4.84	10.04	9.42	-1.14	1.76
1960-66	1.30	1.54	2.02	-0.35	3.62	1.07	0.35	0.37	7.83	4.86	-7.02	1.90	1.71
1966-69	2.27	1.02	2.06	-0.88	1.35	3.39	3.28	3.24	6.14	4.74	8.50	0.82	4.78
1969-73	2.70	1.89	2.94	-0.24	1.34	3.34	3.66	3.22	7.79	-0.53	0.73	-0.10	1.72
1973-79	2.55	0.24	-0.95	1.14	2.49	4.02	4.08	3.42	6.64	-1.45	1.88	3.29	2.75
1979-89	0.87	1.39	0.18	1.51	3.72	0.41	-0.20	-0.51	-1.84	1.50	-1.89	2.05	1.69
1989-93	1.03	1.62	0.77	1.06	4.67	0.57	3.52	-2.65	-0.74	0.98	7.31	2.44	1.95

See footnotes at end of table.



Table 1. Farm production, input use and productivity, 1948-1993 (1948=100)--continued

Year	Total factor input	Purchased inputs					Labor			Capital				Total factor productivity
		All <sup>a</sup>	Fertilizer	Pesticides	Fuels and electricity	Feed, seed and livestock purchases <sup>d</sup>	All	Hired	Self-employed	All	Durable equipment	Real estate	Inventories	
1948	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1949	102	104	103	118	111	104	98	93	99	110	118	102	108	98
1950	102	105	124	149	114	103	94	97	93	120	136	103	107	98
1951	103	109	123	138	117	108	90	94	89	129	152	105	110	101
1952	103	110	130	135	123	107	88	91	86	136	165	106	115	104
1953	102	111	126	143	126	109	83	89	81	140	172	107	118	106
1954	98	104	130	163	125	100	81	84	80	144	180	108	116	110
1955	104	114	131	212	128	113	82	82	82	146	183	109	119	108
1956	103	117	139	299	128	117	77	75	78	147	184	109	121	109
1957	102	121	140	225	126	123	72	72	72	146	181	109	118	109
1958	102	125	138	261	123	129	69	73	68	145	178	109	122	115
1959	105	133	158	332	125	131	69	71	68	146	178	109	126	115
1960	104	132	162	337	127	130	67	71	66	146	180	109	128	118
1961	102	129	168	385	129	124	65	71	63	143	177	106	130	123
1962	102	131	144	435	131	129	64	70	63	142	174	105	134	124
1963	103	135	160	451	133	133	63	70	60	143	174	105	138	127
1964	101	134	179	435	136	130	59	63	58	143	176	105	140	129
1965	100	134	189	525	137	127	58	60	57	143	179	104	135	133
1966	101	143	216	616	140	138	54	54	54	145	184	103	142	131
1967	100	142	216	509	139	138	51	50	51	149	191	106	143	138
1968	99	140	164	607	140	140	49	48	50	150	200	105	146	142
1969	99	145	178	659	142	148	48	49	48	149	203	103	149	143
1970	100	147	183	722	142	152	48	49	47	150	205	103	150	142
1971	99	144	184	851	139	148	47	49	46	152	207	105	148	153
1972	99	148	185	1024	138	152	46	48	46	151	207	103	156	153
1973	102	152	214	1049	140	151	47	49	46	156	211	107	159	156
1974	101	154	236	949	133	150	43	52	40	160	223	109	165	147
1975	100	149	211	968	156	143	43	53	40	161	232	108	160	159
1976	103	158	228	1107	176	150	43	54	39	163	237	108	169	157
1977	101	155	230	1016	184	143	41	52	38	165	244	109	164	168
1978	107	176	234	1382	193	166	39	51	36	165	250	107	170	163
1979	109	186	246	1655	176	177	38	51	34	168	258	108	173	167
1980	110	190	294	1551	171	187	37	49	33	172	266	110	183	161
1981	108	181	261	2050	164	177	37	47	34	171	266	110	171	180
1982	105	171	198	1541	155	183	36	46	33	169	261	108	184	185
1983	101	173	192	1331	150	187	34	45	31	159	249	100	181	168
1984	101	169	230	1398	155	168	34	43	31	162	236	106	160	190
1985	99	164	221	1282	139	170	33	41	30	159	224	106	172	203
1986	95	161	255	1326	130	171	31	40	28	153	208	102	166	203
1987	93	161	215	1325	144	167	30	39	27	145	192	98	162	212
1988	91	152	198	1176	144	163	31	40	28	143	182	98	157	205
1989	91	153	192	1378	143	158	31	38	29	142	174	100	149	222
1990	93	165	195	1414	142	171	31	39	28	141	169	99	157	225
1991	94	167	197	1562	143	167	31	37	29	140	166	99	163	224
1992	94	173	199	1576	142	176	29	36	28	139	161	99	163	239
1993	95	179	212	1545	142	175	29	38	26	136	155	97	170	221
Average annual rates of growth														
1948-93	-0.11	1.30	1.67	6.08	0.78	2.15	-2.75	-2.16	-2.95	0.69	0.98	-0.07	1.18	1.76
1948-53	0.39	2.05	4.62	7.15	4.57	1.77	-3.76	-2.38	-4.20	6.78	10.80	1.37	3.41	1.14
1953-57	0.08	2.15	2.63	11.33	0.16	2.91	-3.41	-5.21	-2.83	0.98	1.35	0.49	-0.16	0.75
1957-60	0.71	3.07	4.87	13.47	0.03	1.94	-2.52	-0.56	-3.17	0.08	-0.21	-0.01	2.65	2.54
1960-66	-0.55	1.35	4.79	10.05	1.66	1.02	-3.69	-4.60	-3.41	-0.20	0.40	-0.93	1.75	1.84
1966-69	-0.57	0.37	-6.45	2.25	0.52	2.23	-3.45	-3.26	-3.50	1.12	3.20	-0.04	1.56	2.84
1969-73	0.60	1.24	4.60	11.62	-0.38	0.60	-0.97	0.18	-1.33	1.00	0.94	0.92	1.76	2.10
1973-79	1.17	3.33	2.32	7.60	3.79	2.60	-3.31	0.51	-4.76	1.26	3.37	0.18	1.37	1.38
1979-89	-1.86	-1.97	-2.48	-1.83	-2.06	-1.13	-2.17	-2.99	-1.82	-1.65	-3.94	-0.77	-1.46	2.72
1989-93	1.17	3.98	2.48	2.86	-0.10	2.66	-1.40	0.15	-2.03	-1.05	-2.81	-0.84	3.23	-0.14

<sup>1</sup>Includes wool, mohair, horses, mules, honey, beeswax, bees, goats, rabbits, aquaculture, and fur animals. These items are not included in the separate groups of livestock and products shown.

<sup>2</sup>Includes tobacco, floriculture and ornamentals, Christmas trees, mushrooms, legume and grass seeds, hops, mint, broomcorn, popcorn, hemp fiber and seed, and flax fiber not shown separately.

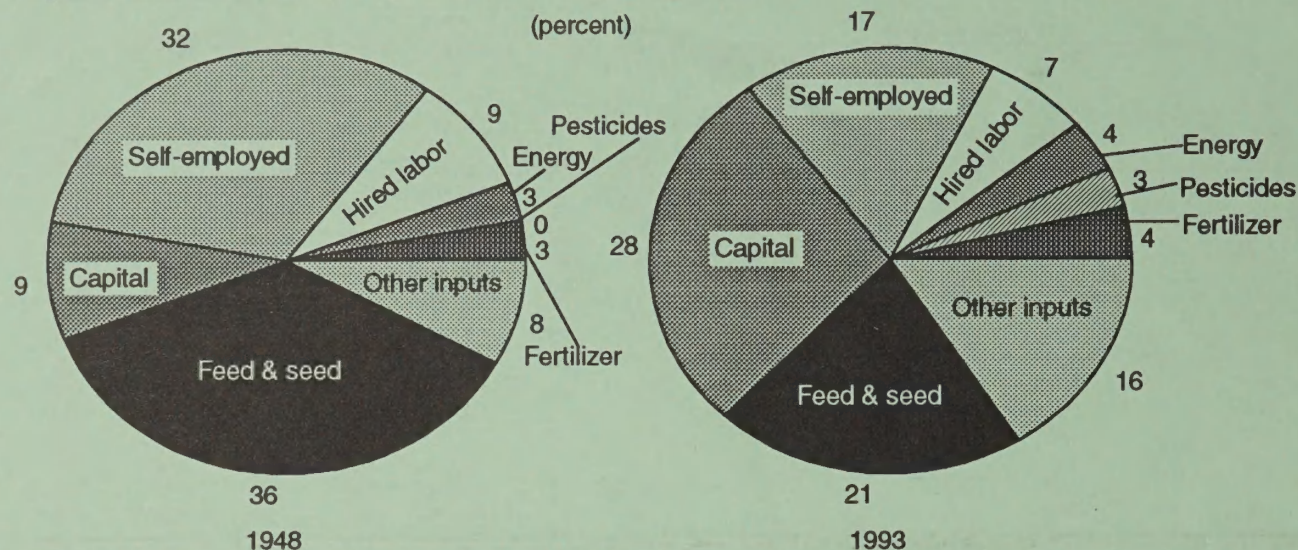
<sup>3</sup>Includes purchased services such as contract labor services, custom machine services, machine and building maintenance and repairs, irrigation fees paid public sellers of water and miscellaneous farm production items.

<sup>4</sup>Includes broiler- and egg-type chicks and turkey poults and imports of livestock for purposes other than immediate slaughter.

Source: USDA, ERS estimates.

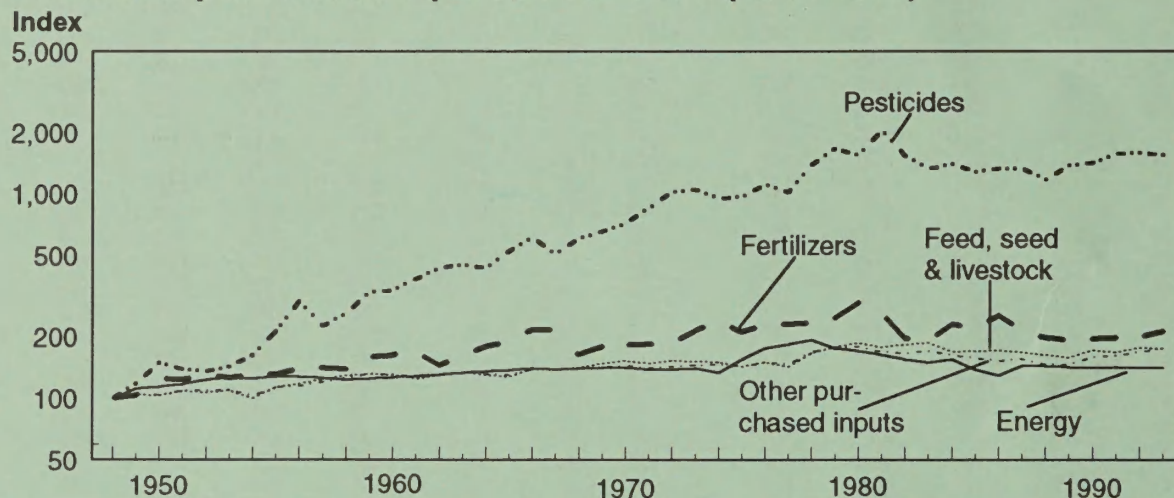


## Input cost shares, 1948 and 1993



Note: Pesticides in 1948=0.3%

## Growth in purchased inputs, 1948-1993 (1948=100)



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